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Electric Arc Welding Torches

George B. Blackhurst, Stanmore, Middlesex, England, assignor to The British Oxygen Canada Limited, Toronto, Ontario, Canada
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5 Claims

This invention relates to manual electric arc welding torches of the kind from which, when in use, a stream of shielding gas is arranged to flow through a nozzle and around a welding arc struck between a workpiece and a consumable electrode fed through the nozzle of the welding torch. Such torches are often somewhat difficult to manipulate in use owing to the connection to the welding torch of an electric cable for welding current, a pipeline for shielding gas, and possibly also a pipeline for coolant water. Additionally the consumable electrode has to be supplied.

In one known welding torch of this kind the consumable electrode is supplied from a reel mounted apart from the welding torch and fed directly to one end of a straight tubular welding head the other end of which is terminated by the nozzle. To this tubular welding head is attached a pistol grip type of handle and the electric cable and pipeline for shielding gas enter the welding torch at the base of this handle, that is, at the end of the handle remote from the welding head. Thus in use the consumable electrode is fed to the welding torch from behind an operator's wrist whereas the electric cable and shielding gas pipeline reach the welding torch from in front or at the side of the operator's wrist. This form of connection where the welding torch may be subject to pulls and restraints at different points and from different directions may impede manipulation of the welding torch in use.

According to the present invention, in an electric arc welding torch of the kind adapted for manual support in use comprising a handle, a welding head mounted on the handle with the axis of the head inclined to the axis of the handle and a nozzle at one end of the welding head, means are provided for guiding a consumable electrode generally longitudinally of the handle and deflecting the electrode through the nozzle to the welding zone, and conduit means and electrical conductor means extending longitudinally of the handle are provided respectively for feeding shielding gas through the nozzle to the welding zone and for conveying electric current to the electrode.

The means for guiding and deflecting the electrode may comprise a flexible sleeve, one end of which enters the welding head, arranged to extend through or adjacent the end of the handle remote from the welding head.

The electrode sleeve and all conduits, cables and the like connections to the torch may be arranged to be carried to the end of the handle remote from the welding head by a flexible sleeve member.

Means for controlling the feed of the electrode to the welding head may be mounted on the torch. Such means may comprise an electric switch arranged to control an electrode feed motor at a position remote from the welding torch.

A feature of the present invention is the provision of an electric arc welding torch adapted for manual support and convertible for use with either a consum-

able electrode or a non-consumable electrode.

The welding head may be provided with means for gripping a non-consumable electrode. Thus, for example, collet means may be provided for gripping a non-consumable electrode in the welding head when contact means for conducting electric current to a consumable electrode have been removed from the welding head.

One construction of electric arc welding torch in accordance with the present invention will now be described by way of example with reference to the accompanying drawing which shows an axial section of the welding torch.

Referring to the drawing, the welding torch which is adapted for use with either a consumable electrode or a non-consumable electrode, comprises a tubular welding head 1 mounted on a tubular handle. The head 1 axis of the head inclined obliquely to that of the handle. The head 1 comprises a tubular body 3 screw threaded at both ends and having a tubular metal shank 4 secured to the side of the tube with the space within the shank intercommunicating with that within the body. The shank 4 is arranged to fit into the tubular handle 2 which is formed in two parts of insulating material, and a sleeve of insulating material 5 is arranged to shield the body 3. A ceramic or other nozzle is coupled to one end of the body 3 and a cap 7 of insulating material is coupled to the other end. The cap 7 is formed with a central aperture 8 through which a consumable electrode 9 may pass, and a collet 10 which is screwed into the nozzle end of the body 3 is arranged to grip a contact tube 11 for the electrode 9 and maintain this tube 11 centrally within the nozzle 6.

Shielding gas is supplied by a pipeline 13 which enters the handle 2 at the end remote from the head 1 and is connected to a conduit 14 within the shank 4. The gas passes to the nozzle 6 by way of collet 10 and an annular passage around the contact tube 11.

Welding current is supplied to the welding head by way of a cable 16 which extends through a pipeline 17 and is connected to the metallic shank 4. A pipeline 20 extends into the handle 2 and passes cooling water for the welding head through a conduit 18 to an annular chamber 19 in the body 3. Cooling water is withdrawn from the shank 4 through the pipeline 17.

A consumable electrode 9 is arranged to be fed to the welding head from a storage reel (not shown) through a sleeve 21 having a liner of a plastics material having a low coefficient of friction, the feeding mechanism being driven by an electric meter and arranged to push the consumable electrode 9 towards the welding torch. The feeding mechanism 50 and meter are associated with the storage reel and are mounted remotely of the torch. An electric switch 22 connected to control the electric meter is mounted in a housing 23 secured to the top of the handle 2 away from the welding head 1, and the sleeve 21 for the consumable electrode 9 extends through this housing. From this housing 23 the sleeve 21 extends generally longitudinally of the handle 2 and through the aperture 8 in the cap 7 of the welding head. Thus the consumable electrode 9 may be fed generally longitudinally of the handle 2 through the sleeve 21, the sleeve deflecting the electrode into the welding head 1.

The pipeline 17 surrounding the cable 16, the pipelines 13 and 20, the sleeve 21 surrounding the consumable electrode 9 and cable 25 connecting the

switch 22 to control the electrode feed motor extend through a sleeve 24 and pass into the housing 23 and handle 2 at the end remote from the welding head 1 and thus extend in front of or at the side of the wrist of an operator holding the torch in use. All restraints on movement of the torch thus act from the same general direction at the end of the handle and it is found that this aids manipulation of the torch.

The welding torch may be converted for use with a non-consumable electrode by removing the contact tube 10 11 from the collet 10 and gripping a non-consumable electrode in this collet. In drawing the tip of this non-consumable electrode is indicated by the reference numeral 26. The cap 7 of the welding head 1 is removed and the sleeve 21 and consumable electrode 9 are withdrawn from the head the upper end of which is then closed by a cap 7a similar to cap 7 but without a central aperture 8.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

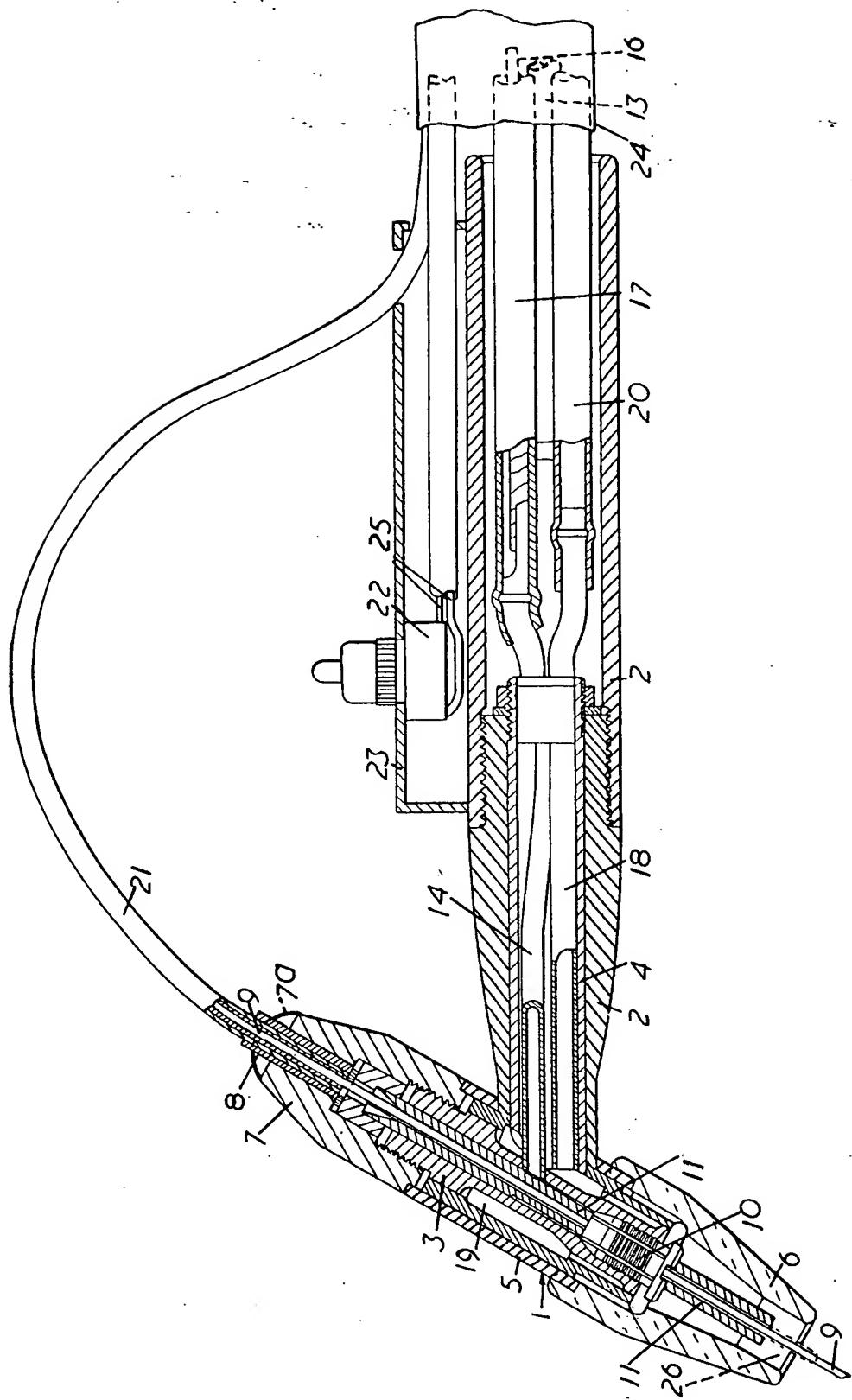
1. An electric arc welding torch of the kind adapted for manual support in use comprising a handle, a welding head mounted on the handle with the axis of the head inclined to the axis of the handle, and a nozzle at one end of the welding head, wherein a flexible electrode sleeve is provided for guiding a consumable electrode generally longitudinally of the handle and deflecting the electrode into the welding head, and conduit means and electrical conductor means extend-

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ing longitudinally of the handle are provided respectively for feeding shielding gas through the welding head and the nozzle to the welding zone and for conveying electric current to the electrode within the welding head, and wherein the electrode sleeve and all conduits, cables and like connections passing to the torch are carried to the end of the handle remote from the welding head.

- 5 2. An electric arc welding torch as claimed in Claim 1, wherein the electrode sleeve and all conduits, cables, and like connections passing to the torch are arranged to be carried to the end of the handle remote from the welding head by a flexible sleeve member.
3. An electric arc welding torch as claimed in Claim 15 1, wherein an electric switch arranged to control an electrode feed motor at a position remote from the welding torch is mounted on the handle.
4. An electric arc welding torch as claimed in Claim 20 1, wherein the welding head is provided with means for gripping a non-consumable electrode.
5. An electric arc welding torch as claimed in Claim 4, wherein collet means are provided for gripping a non-consumable electrode in the welding head when contact means for conducting electric current to a consumable electrode have been removed from the welding head.

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